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PROJECT NUMBER: 1758
PROJECT TITLE: Tobacco Cell Wall Research
PROJECT LEADER: G. H. Bokelman
PERIOD COVERED: February, 1988

I. BLEND COMPOSITION ANALYSIS (G. Bokelman, J. Stimler and
General Analytical)

A. Objectives: (1) Compare the blend compositions of Barclay Lights Ultra Thins, Regular and Menthol, with those of Capri, Regular and Menthol, (2) predict the blend composition of Silkroad (Japan) and (3) predict the blend compositions of six brands of Korean cigarettes.

B. Status: Analytical data for the above mentioned cigarettes were processed by our present mathematical model for determining components in a tobacco blend. In this model, four chemical predictors (total ash; aspartic acid; β -methylvaleric acid, ratio of sample to standard; and cellulose index) were used as independent variables for the four dependent variables: bright lamina, burley lamina, Oriental leaf, and combined bright and burley stems. Stems, of course, may be present in a number of forms, including expanded stems and reconstituted tobaccos.

There are important caveats regarding the application of this methodology. This method of predicting blend components should give accurate results when the actual tobacco components to be used are incorporated into the database, a condition which for practical purposes only can be met for products manufactured by Philip Morris. Inaccurate results may be obtained if this method is applied to unknown blends or blends whose components differ markedly in chemistry from those used in the database. The database for this study consisted of typical commercial tobacco components used by Philip Morris for domestic cigarette production in the first quarter of 1987. We have not yet generated either a "Japanese database" or a "Korean database."

C. Results: The predicted blend compositions for the respective versions of Barclay Lights Ultra Thins and Capri are very similar. Perhaps the most interesting findings are the changes in the two menthol versions compared to the two regular versions (increased content of bright lamina, decreased contents of burley lamina and Oriental leaf). The similarity between the respective versions of Barclay Lights Ultra Thins and Capri is supported by C.I. data for contents of total alkaloids, total reducing sugars, reconstituted tobacco, expanded stems and expanded tobacco. For the sake of comparison, the predicted blend composition of Barclay also has been included.

Table 1. Predicted Blend Compositions for B&W Cigarettes
(values expressed as percentage of total)

		Barclay Lights Ultra Thins	Capri	Barclay Lights Ultra Thins	Capri
Component	<u>Barclay</u>	<u>Regular</u>	<u>Regular</u>	<u>Menthol</u>	<u>Menthol</u>
Bright Lamina	38	40	42	49	57
Burley Lamina	29	31	26	22	16
Oriental Leaf	18	20	22	14	17
Stem	15	9	9	15	10

Previously we made relative comparisons among the blend compositions of Marlboro Lights (Japan) and four cigarette brands produced by Japan Tobacco Inc.--Libera Milds, Mild Seven, Mild Seven Lights and Caster (1). Compared to all these other brands, Silkroad (Japan) is notable for its extremely high content of bright lamina and its low contents of stem and burley lamina (see Table 2).

The predicted blend compositions for the six brands of Korean cigarettes are listed in Table 3. Significant variations among the predicted blend compositions are evident (2). Two of the brands are notable for their absence of Oriental leaf.

We believe that the predicted blend composition values listed in Tables 2 and 3 should be useful for making relative comparisons. However, keeping in mind the caveats listed previously, the accuracy of individual values must be considered somewhat suspect.

Table 2. Predicted Blend Compositions for Japanese Cigarettes
(values expressed as percentage of total)

Component	Mild		Caster	Silkroad	Libera
	Mild	Seven			
	Seven	Lights			Milds
Bright Lamina	48	44	48	70	41
Burley Lamina	20	23	12	9	33
Oriental Leaf	6	5	4	7	8
Stem	26	29	36	14	18

Table 3. Predicted Blend Compositions for Korean Cigarettes
(values expressed as percentage of total)

Component	Pine		Cheong Ja	Silver		Eighty
	Golden	"Orange"		Reed	Eunhasu	
	Lights	(See **)				Eight
Bright Lamina	50	41	49	59	50	43
Burley Lamina	19	24	21	13	23	22
Oriental Leaf	6	0	0	6	2	6
Stem	25	35	31	22	25	29

** "Orange" is the name we are using to designate a brand whose actual name is written only in Korean characters. The cigarette pack for this brand has a distinctive orange wrapper.

- D. Plans: Islands, a new cigarette brand produced by RJR Nabisco for sale in Japan, has been submitted for chemical analyses. As soon as these analytical values are available, we will estimate its blend composition.

E. References:

1. Bokelman, G. H. and J. O. Stimler, memo to C. L. Irving, "Blend Composition of Libera Milds (Japan)," December 3, 1987.
2. Bokelman, G. H. and J. O. Stimler, memo to C. L. Irving, "Blend Compositions of Silkroad (Japan) and Six Korean Cigarette Brands," February 2, 1988.

II. CHEMICAL ANALYSIS OF UNKNOWN FLOCCULATED MATERIAL (S. Baldwin)

- A. Objective: Characterize an unknown material submitted for analysis.
- B. Background: An unknown fluffy, gray-brown solid material was found in the tobacco hopper, following an attempt to prepare low density rod cigarettes (from an all-lamina blend of uncased tobacco) using dextran as a binder. The unknown material, suspected of being dextran, was referred to as "floc."
- C. Results: After conducting a variety of solubility tests and specific carbohydrate analyses, it was concluded that the unknown material was indeed dextran (1). Its dark color may have been acquired from tobacco dust or some type of oil.
- D. Plans: No additional work in this area is planned.
- E. Reference:
1. Baldwin, S., memo to V. Manual, "Chemical Analysis of an Unknown Flocculated Material," February 19, 1988.

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J. L. Charles Monthly
11/3/87

Theoretical mechanistic studies of the production of acrolein from glycerin are in progress. Catalytic effects on ground and transition states will be investigated.

Preliminary experiments have started to determine if chemical reactions can be observed in clusters using supersonic molecular jet spectroscopy. Initial results indicate this may be possible.

Blend Composition - Analyses for the chemicals used to predict blend composition were performed on domestic Capri, Caprice from BAT in Germany and Slim Line from Reemtsma in Germany. The data suggest that Capri and Caprice are identical for all practical purposes. The composition of Slim Line is predicted to be 64% Bright, 16% Burley, 9% Oriental and 11% stem. Similar analyses of Camel and Camel Filter suggest 48 and 41% Bright, 25 and 17% Burley, 8 and 18% Oriental and 19 and 24% stem, respectively. Additional tests were performed on two cigarettes from RJR that are in panel testing.

Packaging Materials - Because of other priorities in Flavor Development, Analytical Research has installed a headspace sampler on a GC and has assumed responsibility for the analysis of volatiles in packaging materials.

Menthol on Foil - Several samples were analyzed for ethanol to support various parts of this program.

Flavor Specifications - Analytical and sensory evaluations were completed for thirty-five of the eighty-seven German market materials. It is anticipated that this phase of the program will be completed during the first quarter of 1988.

Foamed Bound Rod - Work continues to investigate a wide range of degraded pectins to develop a set of QA specifications for degraded pectin.

Analytical Support - Analytical analyses were performed to support domestic leaf purchases, International leaf purchases, GCC product, DIET startup at Cabarrus and Project ART.

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PC: Directors ✓
A. C. Lilly

